

From: [Sorrels, Larry](#)
To: [Hedgpeth, Zach](#)
Subject: RE: summary of GTN Station 13 cost differences
Date: Tuesday, January 25, 2022 2:16:51 PM

Hi Zach:

For the first issue, it appears (b) (5) . Thus, without further description, I would think (b) (5) .

For the second issue, (b) (5) as you describe may be (b) (5)

, (b) (5)

I hope this helps. Keeping the pencil sharp (so to speak) is vital in reviewing these cost estimates, as you well know. Thanks.

Larry S.

From: Hedgpeth, Zach <Hedgpeth.Zach@epa.gov>
Sent: Tuesday, January 25, 2022 11:12 AM
To: Sorrels, Larry <Sorrels.Larry@epa.gov>
Subject: RE: summary of GTN Station 13 cost differences

[Larry,](#)

ODEQ's contested case hearing with GTN/TC Energy is moving forward, and I am working with ODEQ to review the latest version of the cost calculations. There are a couple of items where I could use your input, see below. We should have a revised spreadsheet soon, and I plan to check in with you more thoroughly at that time to run through all the cost elements at issue.

If you are able to give me quick feedback on these items, that would be very helpful:

(b) (5)

but I wanted to check with you.

(b) (5)

(b) (5)

cost analysis, but wanted to check with you.

Thanks as always,

Zach Hedgpeth, PE

206-553-1217

Pronouns: he/him/his

From: Sorrels, Larry <Sorrels.Larry@epa.gov>

Sent: Monday, September 13, 2021 1:57 PM

To: Hedgpeth, Zach <Hedgpeth.Zach@epa.gov>

Subject: RE: summary of GTN Station 13 cost differences

Hi Zach:

I agree (b) (5)

(b) (5)

A couple of notes: (b) (5)

Thanks for the comparison of the cost estimates. Very interesting.

Larry S.

From: Hedgpeth, Zach <Hedgpeth.Zach@epa.gov>
Sent: Monday, September 13, 2021 3:54 PM
To: Sorrels, Larry <Sorrels.Larry@epa.gov>
Subject: summary of GTN Station 13 cost differences

Hi Larry,

As we discussed, I've gone through the following two spreadsheets and summarized the differences between the facility vs the ODEQ cost analyses.

- "SCR 90 percent TC 2021-05-17.xlsx"
- "SCR 051721 DEQ modified.xlsx"

Note: there are no differences in the capital costs. All issues relate to annual costs.

1. Catalyst replacement. See the catalyst replacement tab in the DEQ spreadsheet.
 - a. The facility used the top of the vendor range for catalyst replacement cost, assumed 3-year replacement frequency, and assumed onsite vendor support and crane is required for each replacement event.
 - b. ODEQ prepared a low-end cost estimate using the bottom of the vendor range for catalyst replacement cost, assumed 7-year replacement frequency, and assumed vendor support was not required for each replacement event but that a crane was required. ODEQ then used the average of their low-end cost estimate and the facility's high-end cost estimate.
 - c. SCR Chapter sections of interest:
 - i. pg 29: *"Currently, vendor-guaranteed life for a catalyst layer in coal-fired applications is typically three years [56], and actual catalyst layer lifetimes in such applications are often in the 5 to 7-year range, depending on the condition of untreated flue gas [37]. Gas- and oil-fired applications experience even longer catalyst layer lifetimes."*
 - ii. Pg 77: *"For the most common SCR design, the high-dust SCR, a catalyst layer is typically guaranteed for 16,000 –24,000 operating hours based on information from catalyst vendors. For oil- and gas-fired units, the SCR catalyst life is assumed to be 40,000 hours, and the catalyst life for some gas-fired units has been reported to be up to 60,000 hours."*
2. Indirect Annual Costs (Overhead, Administrative, Property Taxes, Insurance)
 - a. The facility estimates these costs as follows:
 - i. Overhead – 60% of operating and maintenance labor.
 - ii. Administrative – 2% of TCI.
 - iii. Property Taxes – 1% of TCI.
 - iv. Insurance – 1% of TCI.

- b. ODEQ estimates Overhead, Property Taxes, and Insurance as zero. Administrative charges are estimated using Equation 2.69 on page 80 of the SCR chapter.
- c. SCR Chapter Section of interest (page 80).

In many cases, property taxes do not apply to capital improvements such as air pollution control equipment; therefore, for this analysis, taxes are assumed to be zero [45]. The cost of overhead for an SCR system is also considered to be zero. An SCR system is not viewed as risk-increasing hardware (e.g., a high-energy device such as a boiler or a turbine). Consequently, insurance on an SCR system is on the order of a few cents per thousand dollars annually [45]. Finally, there are two categories of overhead, payroll and plant. Payroll overhead includes expenses related to labor employed in operation and maintenance of hardware, whereas plant overhead accounts for items such as plant protection, control laboratories, and parking areas. Because this procedure assumes that no additional labor is needed in operation of an SCR system, payroll overhead is zero and plant overhead is considered to be negligible.

Using these assumptions, indirect annual costs, *IDAC*, in \$/yr, consist of both administrative charges and capital recovery, which can be expressed as:

$$\text{Indirect Annual Cost} = \left(\begin{matrix} \text{Administrative} \\ \text{Charges} \end{matrix} \right) + \left(\begin{matrix} \text{Capital} \\ \text{Recovery} \end{matrix} \right) \quad (2.68)$$

Administrative Charges

Administrative charges may be calculated as:

$$\text{Administrative Charges} = 0.03 \times \left(\frac{\text{Operator}}{\text{Labor Cost}} \right) + 0.4 \times \left(\frac{\text{Annual Maintenance}}{\text{Cost}} \right) \quad (2.69)$$

After reviewing all of these issues again today, (b) (5)

My recommendation (b) (5)

I'll set up a time for us to discuss this soon. Thanks again for your help Larry!

Zach Hedgpeth, PE
 EPA Region 10 -- Seattle
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 206-553-1217
 Pronouns: he/him/his